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In the Supreme Court of the United States

OCTOBER TERM, 1980

GEORGE ARSHAL, PETITIONER

v.

UNITED STATES OF AMERICA

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CLAIMS

BRIEF FOR THE UNITED STATES IN OPPOSITION

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QUESTION PRESENTED

Whether a formula for calculating vectors is patentable subject matter under 35 U.S.C. 101.

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OPINIONS BELOW

The opinion of the Court of Claims (Pet. App. 1a) is reported at 621 F.2d 421. The opinion of the trial judge of the Court of Claims (Pet. App. 45a) is reported at 202 U.S.P.Q. 749 (1979).

JURISDICTION

The judgment of the Court of Claims was entered on March 19, 1980, and a motion for rehearing was denied on June 27, 1980 (Pet. App. 109a). The petition for a writ of certiorari was filed on Sept. 19, 1980. The jurisdiction of this Court is invoked under 28 U.S.C. 1255.

STATUTE INVOLVED

35 U.S.C. 101 provides:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

STATEMENT

The petitioner brought this action in the Court of Claims alleging that claims 2, 3, 6 and 7 of his patent [1] are infringed by the guidance systems in the Navy's Poseidon and Trident missiles (Pet. App. 4a). Both the Court of Claims trial judge and the panel of the Court of Claims found that the patent was invalid under 35 U.S.C. 101, because it defined an invention which is essentially directed to a mathematical

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[1] Petitioner has filed a separately bound Pet. App. 4, containing a copy of the patent, No. 3,319,052.

equation. See *Gottschalk* v. *Benson*, 409 U.S. 63 (1972); *Parker* v. *Flook*, 437 U.S. 584 (1978).

The patent, entitled "Directional Computer," defines petitioner's invention as "a vectorial data processing system for extracting or prescribing directions and their rates of change from given input vectors" (Pet. App. 5a). Much of the specification is concerned with vector mathematics.[2] Claim 2 of the patent recites three elements (Pet. App. 32a; Pet. App. 4 Column 10).[3] One element specifies a mathematical equation to calculate an output vector from a given input vector (see Pet. App. 18a & 6a).[4] The

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[2] The trial judge determined that to comprehend the legal issues it was necessary to have a basic understanding of the vector mathematics involved, and set forth a brief discussion of the concepts of vectors, vector algebra and vector calculus in Appendix B to his opinion (Pet. App. 34a-44a, 108a). Vectors are physical quantities, such as velocity, with both magnitude and direction; they are distinguished from scalar quantities, such as temperature, which have only magnitude (Pet. App. 34a). A vector is typically described by its projections on the perpendicular axes of a reference frame. A vector, a reference frame and the vector's projections on the perpendicular axes of a reference frame are illustrated in Appendix B of the opinion at Pet. App. 36a. In specifying vectors in terms of their projections on a reference frame, the reference frame being used must be identified. Otherwise, the projections are meaningless (Pet. App. 35a).

[3] The trial judge found claim 2 to be illustrative of all the claims in suit (Pet. App. 50a-51a), although he also separately analyzed the other three claims involved and found that their differences from claim 2 were not significant (Pet. App. 71a-75a). Petitioner does not dispute this conclusion; he refers simply to claims 2 and 6 as the claims "at issue" (Pet. 4, n.2; cf. Pet. 3, 5).

[4] The mathematical equation is $\overline{b} = \int (\overline{b} \times \overline{Y})\, dt$, in which $\overline{Y}$ is the input vector and $\overline{b}$ is the output vector (Pet. App. 18a

other two elements specify the reference frame with respect to which the vectors are expressed, and the means for obtaining the input vectors (Pet. App. 32a; Pet. App. 4 Column 10).

The trial judge followed the opinions of the Court of Customs and Patent Appeals that interpret this Court's opinions in *Gottschalk* v. *Benson*, *supra*, and *Parker* v. *Flook*, *supra* (Pet. App. 52a-62a).[5] He therefore considered whether the claims wholly preempt a mathematical formula. (Pet. App. 58a, 64a-65a).[6]

In analyzing claim 2, the trial judge separated it into elements (a), (b) and (c) (Pet. App. 62a). Focusing first on element (c), he found that it does recite a mathematical calculation. Moreover, since the claim is not limited to any specific technology, machinery, or end-use, element (c) wholly preempts the recited formula (Pet. App. 63a-64a).

He then considered the effect of the other two elements on element (c). He found that element (a) simply specifies the reference frame made necessary by the equation, and that since the equation operates on vectors and vectors must be expressed in terms of a reference frame, specification of a reference frame is essential to implementation of the equation (Pet.

& 43a). This is an integral equation in vector calculus as discussed by the lower court (Pet. App. 36a-44a).

[5] *In re Christensen*, 478 F.2d 1392 (1973); *In re Waldbaum*, 559 F.2d 611 (1977); *In re Richman*, 563 F.2d 1026 (1977); *In re de Castelet*, 562 F.2d 1236 (1977); *In re Freeman*, 573 F.2d 1237 (1978); *In re Sarkar*, 588 F.2d 1330 (1978).

[6] The trial judge did recognize that this Court held in *Parker* v. *Flook*, *supra*, 437 U.S. at 595, that a claim for an improved method of calculating is unpatentable subject matter even when tied to a specific end use (Pet. App. 69a).

App. 65a). In analyzing element (b), he found that since the equation is a calculation using an input vector, the calculation necessarily requires means to generate the value of the input vector. Element (b) of the claim, he noted, is for just that purpose (Pet. App. 64a).

The trial judge relied on a series of cases[7] in the Court of Customs and Patent Appeals holding that a patent claim that recites a mathematical equation is not converted to patentable subject matter by the addition to the claim of what that court terms "data gathering" steps (*i.e.*, the establishing of values for the variables in the equation) (Pet. App. 65a-67a).[8] In light of those cases, the trial judge concluded that the claimed subject matter is not patentable subject matter and, therefore, the claim is invalid (Pet. App. 70a).[9]

The Court of Claims agreed with the trial judge's conclusion of invalidity under Section 101, and adopted his opinion and conclusion of law to that effect as the basis for its judgment (Pet. App. 1a-2a).[10]

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[7] *In re Christensen*, 478 F.2d 1392 (1973); *In re Sarkar*, 588 F.2d 1330 (1978); *In re Richman*, 563 F.2d 1026 (1977); *In re Freeman*, 573 F.2d 1237 (1978).

[8] The trial judge noted that under the CCPA's precedents, the novelty of the data gathering steps is irrelevant (Pet. App. 66a-67a).

[9] The trial judge also denied defendant's motion for invalidity under 35 U.S.C. 103 and concluded that claims 2 and 6, if valid, would be infringed by the accused structures.

[10] The Court of Claims found it unnecessary to pass on the issues of the patent's validity under 35 U.S.C. 103 or of whether it was infringed, and deleted all references to those issues in adopting the trial judge's opinion (Pet. App. 2a).

ARGUMENT

Petitioner contends that the Court of Claims failed to consider his patent as a whole (Pet. 6, 11), and to recognize its "technological usefulness." He asserts that the analysis of the Court of Claims is inconsistent with that reflected in the decision of the Court of Customs and Patent Appeals in *Diamond* v. *Bradley*, No. 79-855, which is currently under submission in this Court, and asks that this case be considered with *Bradley* (Pet. 11).

These claims are without merit. For the reasons stated in our briefs in *Bradley*, *supra*, and in *Diamond* v. *Diehr*, No. 79-1112, we submit that the Court of Customs and Patent Appeals has given an unduly restrictive interpretation to this Court's decision in *Parker* v. *Flook*, *supra*.[11] But even under that interpretation, the Court of Claims concluded that petitioner's patent is invalid. Accordingly, the court below has already applied to the particular facts of this case the legal standard which petitioner urges; he contends (Pet. 10-11) simply that the standard was misapplied here because of a misreading of the patent claims.[12] That essentially factual claim does not warrant further review.

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[11] We are sending petitioner copies of those briefs.

[12] Petitioner's suggestion (Pet. 11) that the Court of Claims' approach is inconsistent with that of the Court of Customs and Patent Appeals in *Bradley* is incorrect. *Bradley* turned on the absence of a "mathematical algorithm" in the claimed invention. Although, for the reasons stated in our brief in *Bradley*, we believe this restriction on this Court's precedents is incorrect, it is entirely clear that the instant case does involve a mathematical algorithm. There is accordingly no reason to suppose that the Court of Customs and Patent Appeals would have reached a different result than was reached by the court below in this case.

Moreover, petitioner's claim that the court below failed to consider his claim as a whole, and instead focused solely on the element of the claim dealing with numerical computation (Pet. 6-7), is refuted by the court's opinion. Although the court initially considered the mathematical computation element of claim 2, it also considered the other elements of that claim, but found them insufficient to distinguish the claim from one solely for a mathematical equation (Pet. App. 19a-26a, 64a-70a). It similarly considered all of the elements of the other disputed claims (Pet. App. 26a-30a, 71a-75a). In sum, the court concluded that the mathematical equation is the essence of each claim, and that the other elements simply specify the variables for use in the calculation.[13]

Petitioner's suggestion (Pet. 9) that the "technological usefulness" of his claimed invention brings it within the scope of Section 101 reflects a fundmental misunderstanding of this Court's decisions in *Gottschalk* v. *Benson*, *supra*, and *Parker* v. *Flook*, *supra*. Whether an invention is "useful" within the

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[13] Petitioner asserts (Pet. 6) that the gyroscopically stabilized reference frame is patentable subject matter which does not lose its patentability when combined with an unpatentable numerical computation. But petitioner conceded below that all of the elements of his claimed invention except the equation were old (Pet. App. 78a n.27). Specifically, he stated that the reference frame was disclosed in a prior patent, No. 2,752,793 (Pet. App. 76a n.25). The contention that the addition of a novel, but unpatentable, mathematical algorithm to previously known elements results in a claim to patentable subject matter was rejected in *Parker* v. *Flook*, *supra*, 437 U.S. at 589-592, 594.

meaning of Section 101 is an entirely separate question from whether it describes patentable subject matter. Compare *Brenner* v. *Manson*, 383 U.S. 519, 528-536 (1966), with *Gottschalk* v. *Benson*, *supra*, and *Parker* v. *Flook*, *supra*. Thus, the unpatentability of formulas and scientific principles does not rest on any belief that they are less useful than patentable processes. Indeed, it is their very utility as the "basic tools of scientific and technological work" that make them unpatentable. *Gottschalk* v. *Benson*, *supra*, 409 U.S. at 67, quoted in *Parker* v. *Flook*, *supra*, 437 U.S. at 589.

CONCLUSION

The petition for a writ of certiorari should be denied.

Respectfully submitted.

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